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Locating appraisal wells in the Tombua field using inversion of wide angle AVO to lithology

Lower Miocene turbidite channel sands have proven to be prolific reservoirs in Block 14. These sands show a distinct near to wide angle AVO signature. This signature is the result of the V_p/V_s ratio and anisotropy contrasts between the sands and the shales. There is solid evidence of strong shale anisotropy in the lower Miocene with Epsilon values estimated to be about 0.3. The reservoir sands typically show a moderate high impedance response at the near offsets, go through a phase change at about 30 degrees and build up to a strong low impedance signature at large propagation angles (40-60 degrees).

A processing flow has been developed to "invert" this AVO behavior and generate a lithology prediction cube. This cube has been used very successfully to locate appraisal wells in the Tombua field. Because of the complexity and number of turbidite channel systems 3D visualization was used to effectively map in 3 dimensions the target reservoirs. This allowed for the design of complex deviated well trajectories optimized for testing multiple reservoirs. We will present results that prove the effectiveness of this AVO inversion to lithology.